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MARS OBSERVER RADAR ALTIMETER RADIOMETER (MORAR)

by

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Our involvement with the Mars Observer Project will permit us to contribute to the advancement of the state of the topographic and hypsometric knowledge of Mars to a level of 10 meters or better over the surface of the planet Mars, to measure the microwave surface brightness temperature of Mars with an accuracy of 15 - 20 degrees Kelvin over the mission lifetime and a repeatability of + 2.5 degrees Kelvin over 24 hours, and to measure globally, surface returned power related to radar cross section (Sigma Zero) with an accuracy of 1 dB and a repeatability of .5 dB.

We are responsible for accomplishing the MORAR Hardware Development, Ground Data Processing, and the Mission Operations required by the MORAR Principal Investigator, Dr. David E. Smith/Code 620, whose scientific objectives are: a) to define globally the topography of Mars at sufficient vertical resolution and spatial scale to address both large-scale geophysical and small-scale geologic problems, and b) to obtain global surface electrical and scattering properties of the upper several centimeters of the Martian surface for assessment of the composition, physical state, and volatile distribution of the surface. 8100

The MORAR instrument development role was assigned to The Johns Hopkins University/Applied Physics Laboratory (JHU/APL) via a

NASA Defense Purchase Request to the U.S. Navy, the contracting agency for The JHU/APL. The Technical Monitoring of their activities is being accomplished by Code 820 personnel. The MORAR Ground Data Processing and Mission Operations will be accomplished within Code 672. MORAR Project Management is being accomplished by Code 672. MORAR Science will be performed both within the GSFC and various universities under the leadership of the Principal Investigator.

During FY87, the MORAR Experiment was confirmed as one of seven experiments to be conducted by the Mars Observer Mission. The MORAR Experiment Implementation Plan was established and approved by JPL. A Letter Agreement was implemented between the GSFC and the JPL to effect the MORAR. The MORAR Preliminary Design was initiated at The JHU/APL. The Interface Definition with the Mars Observer Spacecraft was initiated. The planning documentation for the Ground Data Processing System was initiated. The first key document defining the activities necessary to convert raw MORAR telemetry data into engineering parameters during the first of three Ground Data processing steps was established at the Preliminary level. Participation in the first MORAR Science Team meeting conducted in September 1987 was successfully accomplished. During the third and fourth quarters of FY87, the necessary replanning was initiated to accomplish the MORAR Investigation, in response to a revised Mars Observer launch date of 1992, instead of 1990. This replanning is still underway.